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Two new species false scorpion genus *Ephippiochthonius* Beier, 1930 (Arachnida: Pseudoscorpiones: Chthoniidae) from the Western Ciscaucasia, Russia

Два новых вида ложных скорпионов рода *Ephippiochthonius* Beier, 1930 (Arachnida: Pseudoscorpiones: Chthoniidae) с Западного Предкавказья, Россия

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KEY WORDS*:* Russia, Caucasus, Krasnodar Region, new species, false scorpion.
КЛЮЧЕВЫЕ СЛОВА: Россия, Кавказ, Краснодарский край, новый вид, ложные скорпионы.

ABSTRACT. Two new species of pseudoscorpions, *Ephippiochthonius sarmaticus* sp.n. and *Ephippiochthonius oryzis* sp.n. are described from the Krasnodar Region, Russia. These are first valid records for this genus in Russia. Diagnostic features of these species as well as comparison with similar species within the genus are provided and discussed.

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РЕЗЮМЕ. Описывается два новых вида ложных скорпионов *Ephippiochthonius sarmaticus* sp.n. и *Ephippiochthonius oryzis* sp.n. из Краснодарского края, Россия, — первые достоверные находки для этого рода в России. Приводятся и обсуждаются диагностические особенности этих видов, а также сравниваются с близкими видами этого рода.

Introduction

The fauna of pseudoscorpions in Russia has been studied extremely unevenly and fragmentary. The number of described valid species varies from 40 [Harvey, 2013] to 48 [Mikhailov, 2016]. Recently, the interest to the group increased [Kozminykh, 2017; Turbanov *et al*., 2017; Kolesnikov, Turbanov, 2018; Krajčovičová *et al*., 2018; Nassirkhani *et al*., 2018], bringing some additional faunistic and taxonomic data. The highest diversity of pseudoscorpions is recorded in the southern regions (e.g. Black Sea area, and Caucasus region) [Dashdamirov, Schawaller, 1992]. However, the number of records on pseudoscorpions across the plains in the south of Russia is very low if compared with piedmont and mountain areas. During our study of soil fauna in the surroundings of rice paddies in the Krasnodar Region, we recorded a number of pseudoscorpion species. Some of them have not been described yet.

The family Chthoniidae Daday, 1888 in Russia includes four species so far: *Mundochthonius basarukini* Schawaller, 1989 from Kunashir and Sakhalin islands [Schawaller, 1989]; *M. ussuricus* Beier, 1979 from the

Primorsky Region [Beier, 1979; Schawaller, 1985]; *Chthonius shelkovnikovi* Redikorzev, 1930 from Krasnaya Polyana settlement near the city of Sochi in the Krasnodar Region; *Ephippiochthonius tetrachelatus* (Preyssler, 1790) known from Krasnaya Polyana and Khosta settlements in the Krasnodar Region, from three locations in the Northern Ossetia-Alania, the city of Zheleznovodsk in Stavropol Region [Schawaller, 1983; Schawaller, Dashdamirov, 1988], and from the Kizil-Koba Cave in Crimea [Lebedinsky, 1914; Pliginsky, 1927]. Besides that, a number of species are known for Transcaucasia (Azerbaijan, Armenia, Georgia): *Chthonius satapliaensis* Schawaller et Dashdamirov, 1988, *Ch. ponticus* Beier, 1965, *Ch. azerbaidzhanus* Schawaller et Dashdamirov, 1988 è *Ephippiochthonius fuscimanus* (Simon, 1900) [Dashdamirov, Schawaller, 1992].

Recently the genus *Ephippiochthonius* Beier, 1930 was restored as a valid taxon by Zaragoza [2017]. The genus is widely distributed across the Mediterranean-Macaronesian region, reaching Iran to the east, and Scandinavia to the north. There are records of this genus from other parts of the world (North and South America, Hawaii, Cuba, Seychelles and southwestern Australia). Gardini [2013] revised the Italian species of this genus; Zaragoza [2017] revised the species of this genus in the Iberian Peninsula, Balearic Islands and Macaronesia.

Caucasian species of the genus *Ephippiochthonius* are poorly studied. There are only records of two widely distributed ones, *E. tetrachelatus* (Preyssler, 1790) and *E. fuscimanus* (Simon, 1900), each of which could be in fact a group of species [Dashdamirov, Schawaller, 1992; Gardini, 2013; Zaragoza, 2017]. The two new species of the genus *Ephippiochthonius* from the Western part of Ciscaucasia (Krasnodar Region, Russia) are described and illustrated in this paper.

Materials and methods

Soil samples were collected in the summer of 2016 in Krasnodar Region (Kuban-Priazovskaya lowland of the Western part of Ciscaucasia), the major agricultural region in Russia, near the city of Krasnodar (Map). Four treatments were chosen (Fig. 1): rice paddy, bund near the rice paddy, upland crop field seeded next year after rice and control site with seminatural grassland vegetation (steppe). Vegetation description, main soil edaphic characteristics, number of replicates and site locations at each sampling site are shown in Korobushkin *et al*. (submitted). To collect soil macrofauna, we obtained three soil samples at each site using a corer of 20 cm in diameter, down to the depth of 15 cm. Soil samples were delivered to the laboratory in coolboxes at a temperature of ca. +10°C and processed within 2–3 days. Extraction of macrofauna was performed using Tullgren extractors into a mixture of alcohol, water and ethylene glycol at a ratio of 80:15:5 with addition of a droplet of detergent. The extraction lasted for 7 days, the time sufficient to make soil reach an air-dry condition. Animals were sorted out from the samples under a binocular microscope and identified under a light microscope.

The material is deposited in the collection of the Zoological Museum of Moscow University (ZMMU), Russia.

All pseudoscorpions collected were fixed in a 96% ethyl alcohol. For morphological examination under a light microscope, they were cleaned in pure lactic acid and temporarily mounted on microscopic slides. Some specimens were dissected for a more detailed study of the chelicerae and pedipalps. All drawings were made from microscope preparations using an RA-4 *camera lucida* attached to a Biomed 6 variant 3 microscope. After the study, each sample, together with dissected body parts, was returned to a tube containing 96% ethanol.

The measurements were taken with an ocular micrometer using the reference points proposed by Chamberlin [1931] and expressed in millimeters, followed by standard ratios in parentheses. The ratios provided were: length to width for carapace, chelicerae and pedipalps, except in the case of the chela and its hand, for which the depth was used instead of width [Mahnert, 2011]. We applied terminology used by Chamberlin [1931], with amendments proposed by Harvey [1992], and Judson [2007]. The chaetotactic formulae of the carapace and chelicera are given according to Gabbutt & Vachon [1963]. Annotations for carapacal setae are shown in Fig. 2A. The terms "sublateral ocular seta" (*osl*) and "lateral ocular seta" (*ol*) were used in accordance with the interpretation of Gabbutt & Vachon's [1963] for the ocular row. Tactile setae on tergites IX and XI and sternite X are frequently lost in preserved specimens. In such cases their tactile nature was determined by a larger diameter of the areolar insertion in comparison with other setae on the same segment and no measurement data were provided. Following Gardini [2013, 2014], measurements of the pedipalpal trochanter and of all parts of legs I and IV were excluded because they added too little meaningful information.

Abbreviations used in text and figures: *al* — anterolateral seta of carapace; *ame* — anteromedial seta of carapace; *cs* — cheliceral spinneret; *di* — isolated subapical tooth; *dps* — distal marginal seta of pedipalpal; *eh* — edge; *fa* — antiaxial lyrifissure of fixed chelal finger; *fb* — basal lyrifissure of fixed chelal finger; fd_1, fd_2, fd_3 — dorsal lyrifissures of the fixed chelal finger; *hd* — distal lyrifissure of chelal hand; *hp* — proximal lyrifissure of chelal hand; *ldb*, *ldst*, *ldt*, *lvb*, *lvt* — lyrifissures associated with cheliceral setae *db*, *dst*, *dt*, *vb* and *vt*, respectively; *m* — microseta; ma_1, ma_2 — antiaxial lyrifissures of movable chelal finger; *ol* — lateral ocular seta of carapace; *om* — medial ocular seta of carapace; *osl* — sublateral ocular seta of carapace; *pc* — coupled sensilla; *pl* — posterolateral seta of carapace; *pm* — posteromedial seta of carapace; *sp* — subdistal protuberance; T — tactile seta; *td* — accessory tooth.

The distribution map was created using Google Earth Pro version 7.3.2.5495 and Adobe Photoshop CS6. The final images were processed with Adobe Photoshop CS6.



Fig. 1. An example of the type biotope, a bund between drained rice paddies. Photo by D.I. Korobushkin.
Рис. 1. Пример типового биотопа — валик между осушенными рисовыми чеками. Автор фотографии Д.И. Коробушкин.

Taxonomic part

Ephippiochthonius sarmaticus **sp.n.**
Fig. 2, Map.

HOLOTYPE ♂ (ZMMU TI-50), Russia, Krasnodar Region, close to Risoopytny settlement (45°13′17″N, 38°16′11″E), rice paddy bunds, 1.06.2016, leg. K.B. Gongalsky.

PARATYPE: 1 ♂ (ZMMU TI-51), same collecting data as holotype; 1 ♂ (ZMMU TI-54), Russia, Krasnodar Region, close to Mogukorovsky settlement (45°08′06″N, 38°11′50″E), rice paddy bunds, 2.06.2016, leg. K.B. Gongalsky.

DISTRIBUTION. Known from the type locality so far.

NAME. Named after the Sarmatians (ancient Greek Σαρμάται, Latin Sarmatae), nomadic Iranian-speaking tribes of the late Iron Age (VI–IV centuries BC), who inhabited the steppe regions from the Tisza and Danube watersheds in the west to the Aral Sea in the east, including Ciscaucasia and North Caucasus, from where the described species is collected.

DIAGNOSIS (♂, ♀ unknown). An eyed epigean *Ephippiochthonius* that differs from the other species of the *fuscimanus*-group in the following combination of characters: movable cheliceral finger with isolated subapical tooth (*di*) level with spinneret; spinneret (*cs*) present; carapace without epistome; the distance between the anterior and posterior eyes is less than the diameter of the anterior eyes; posterolateral seta (*pl*) of carapace absent; pedipalpal hand (in lateral view) with weakly depressed at level of *ib*/*isb* and an abrupt slope between trichobothria *ib*/*isb* and *eb*; dorsal-antiaxial surface of the chelal hand between the hump and trichobothria *eb*/*esb* flattened, limited by a marked edge; fixed and movable chelal fingers respectively with 13–14 and 6–7 triangular teeth; chelal teeth progressively decreasing in size; fixed chelal finger at level of *est*-*it* with 4 teeth occupying 0.1 mm (distance between successive apices 0.03 mm); proximal half of movable chelal finger with weakly undulated marginal lamina; lyrifissure *ldb* on chelicera present; chelal lyrifissure ma_2 present; length of chela 0.65–0.67, length of movable chelal finger 0.37–0.38; chela 5.16–6.0 times as long as deep; ratio of pedipalpal femur/carapace 1.25–1.32.

Description of adults (♂, ♀ unknown). Integument pigmented, carapace, tergites, chelicerae and pedipalps brown; hispid granulation on carapace, on cheliceral palm, on ventrodistal surface of chelal hand and on the base of movable chelal finger.

Carapace subquadrate; anterior margin (Fig. 2A–C) strongly dentate between median macrosetae, without epistome; ocular area as in Fig. 2A, anterior eyes with convex lens (diameter 0.037–0.038 mm), posterior eyes reduced to a smooth cuticular area (diameter 0.032–0.034 mm), all eyes with tapetum; distance from anterior eyes to anterior margin of carapace 0.033–0.037 mm; the distance between the anterior and posterior eyes 0.015–0.018. Chaetotaxy: 9 (18) macrosetae and 2 preocular microsetae (*m*) on each side, posterior area with 2 medial macrosetae (*pm*), posterolateral seta (*pl*) absent, macrosetae thick; setal formula (preocular microsetae excluded): 4:6:4:2:2, anteromedial setae 0.072–0.075 mm long, anterolateral setae 0.05–0.063 mm long,

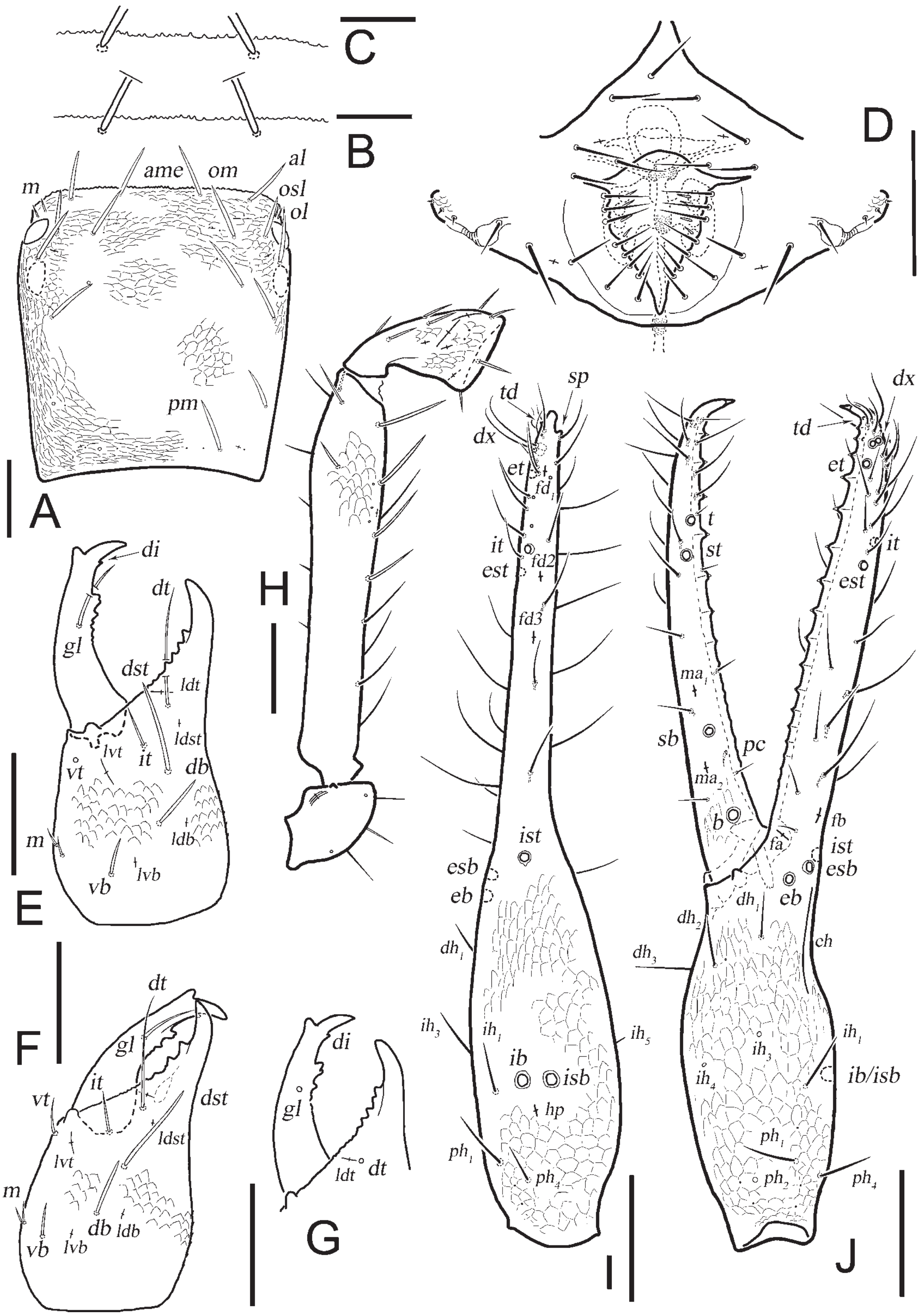
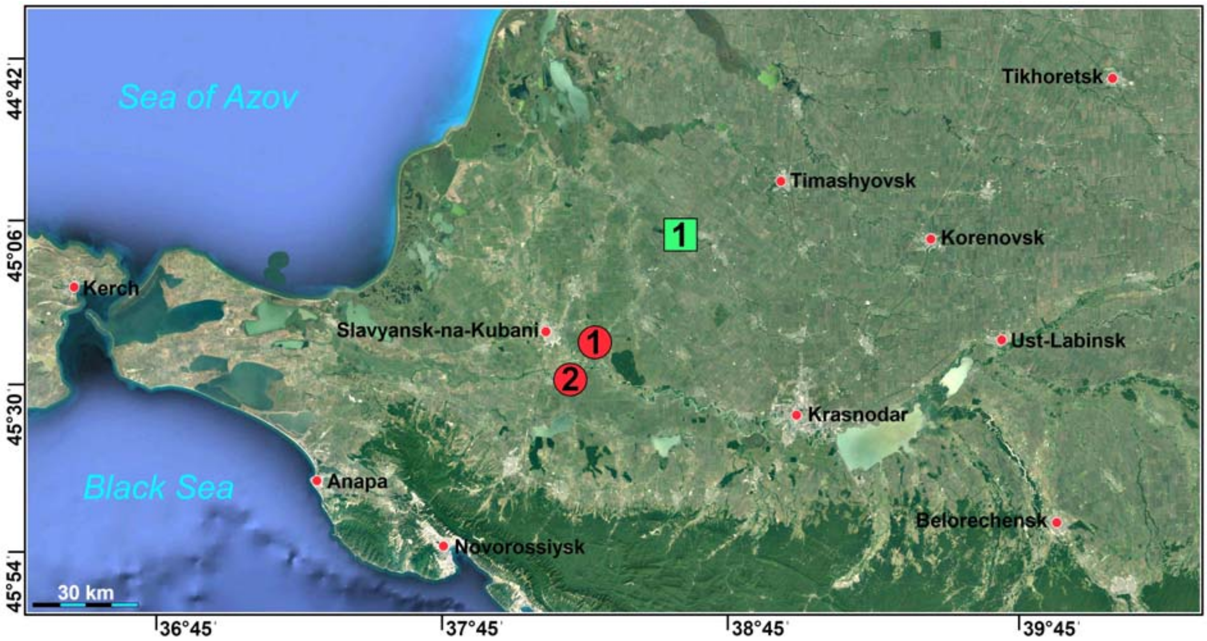


Fig. 2. *Ephippiochthonius sarmaticus* sp.n., ♂: A — holotype, carapace, dorsal view; B — holotype, anterior margin of carapace; C — paratype, anterior margin of carapace; D — holotype, genital area, genitalia are indicated by a dashed line; E — paratype, left chelicera; F — holotype, left chelicera; G — paratype, fingers of left chelicera, partial view; H — holotype, left pedipalp; I — holotype, left chela, dorsal view; J — holotype, left chela, lateral view. Scale bars: 0.1 mm (A, D–J); 0.05 mm (B, C).

Рис. 2. *Ephippiochthonius sarmaticus* sp.n., ♂: A — голотип, панцирь, сверху; B — голотип, передний край панциря; C — паратип, передний край панциря; D — голотип, генитальная область, гениталии показаны пунктирной линией; E — паратип, левая хелицера; F — голотип, левая хелицера; G — паратип, пальцы левой хелицеры, показана часть хелицеры; H — голотип, левая педипальпа; I — голотип, левая хела, сверху; J — голотип, левая хела, сбоку. Масштаб: 0,1 мм (A, D–J); 0,05 мм (B, C).



Map. Finding points for described species of false scorpions in the territory of Western Ciscaucasia (Krasnodar Region, Russia). The species *Ephippiochthonius oryzis* sp.n. (red circle): 1 — close to Risoopytny settlement; 2 — close to Mogukorovsky settlement. The species *Ephippiochthonius oryzis* sp.n. (green square): 1 — close to Kalininskaya settlement.

Карта. Точки находок описываемых видов ложных скорпионов на территории Западного Предкавказья (Краснодарский край, Россия). Вид *Ephippiochthonius oryzis* sp.n. (красный круг): 1 — район пос. Рисоопытный; 2 — район хутора Могукоровский. Вид *Ephippiochthonius oryzis* sp.n. (зеленый квадрат): 1 — район станицы Калининской.

sublateral ocular setae 0.05–0.058 mm long, lateral ocular setae 0.063–0.072 mm long; 4 lyrifissures anteriorly and 2 posteriorly.

Chaetotaxy of tergites 4:4:4:4:6:6:6:6:1T2T1:4:1T2T1:0, tergites IX and XI each with 2 sublateral tactile setae.

Chaetotaxy of sternites 9–10:(3)10(3):(2)9(2):(1)6–7(1):(1)4(1):(1)4(1):6:6:2T1T2:0:2, sternite X with 2 submedial tactile setae, in addition, genital notch of ♂ (Fig. 2D) flanked by 7 setae on each side (between 3 and 4 setae noticeable distance) and 4+4 internal glandular setae.

Genitalia. ♂ genitalia as in Fig. 2D.

Chelicera (Fig. 2E–G) with 6 setae and 2 lateral microsetae on hand; seta *vb* 0.025–0.027 mm long, seta *it* 0.032–0.037 mm long, seta *db* 0.05 mm long, seta *dst* 0.068–0.08 mm long, microsetae 0.012–0.015 mm long; setae *db* and *dst* thicker than others; hand with 5 dorsal and 1 ventral lyrifissure, lyrifissure *ldb* present. Fixed finger with 4–5 teeth proximally reduced in size and 4– proximal microtubercles; movable finger with a small isolated subapical tooth (*di*) at the same level level with the spinneret (*cs*), 3 teeth (the first distal two teeth fused together and prominent) and 3–4 proximal tubercles; *gl* ratio 0.55–0.58; spinneret prominent and apically rounded; rallum with 11 blades; serrulae interior and exterior respectively with 12 and 14 blades.

Coxal setae: Pedipalpal coxa with 5 setae (including 2 on manducatory process), distal marginal seta of disk 0.08–0.10 mm long; coxa I 3 + 3 marginal microsetae, distal marginal seta 0.06–0.07 mm long; II 4 + 9–12 bipinnate coxal spines, III 5–6 + 3–6 bipinnate coxal spines and IV 5–6; intercoxal tubercle bisetose.

Pedipalp: femoral chaetotaxy 3:6:2:5:1 (Fig. 2H). Chela (Fig. 2I–J) with hand weakly depressed at the level of *ib*/*isb* and an abrupt slope between trichobothria *ib*/*isb* and *eb*; dorsal-antiaxial surface of the chelal hand between the hump and trichobothria *eb*/*esb* flattened, limited by a marked edge (*eh*); chaetotaxy 4:5:3; seta ph_3 lacking, setae ih_1 slightly proximal of trichobothria *ib*/*isb*, whereas setae ih_3 is clearly distal and ih_4 slightly distal of *ib*/*isb*. Fixed finger with 13–14 teeth, mostly pointed and proximal half progressively decreasing in size, dental row reaching slightly proximal of trichobothrium *sb*; base of fixed finger with 4–5 microtubercles; tip of fixed finger with a modified accessory tooth (*td*) on antiaxial face; tip of fixed chelal finger of ♂ with a deep hollow on paraxial face and a pronounced subdistal protuberance (*sp*); fixed chelal finger at the level of *est*-*it* with 4 teeth occupying 0.1 mm (distance between successive apices 0.03 mm). Distal half of movable chelal finger with 6–7 upright, triangular teeth with dental canals, with one subdistal very small or absent tooth, all with dental canals, level halfway between trichobothria *st* and *sb*; proximal half of movable chelal finger with weakly undulated marginal lamina and few microtubercles at the level of *sb*; coupled sensilla *pc* halfway between *b* and *sb*, mostly nearer *sb*; trichobothria as in Fig. 2J, *eb*-*esb*-*ist* mostly placed in a straight line; distance between *st* and *sb* 1.8–2.0 times longer than that between *sb* and *b*. Chelal lyrifissure patterns *hp*, *fb*, *fa*, fd_1, fd_2, fd_3, ma_1, ma_2 present, *hd* absent.

Measurements and ratios. ♂ holotype, followed by other ♂♂ in square brackets: Body 1.19 [1.20–1.21]. Carapace 0.36/0.33 (1.09) [0.34/0.31–0.33 (1.03–1.1)]. Chelicera 0.27/0.13 (2.08) [0.26–0.27/0.13 (2.0–2.08)], movable finger 0.16 [0.15–0.16]. Pedipalp: femur 0.45/0.08 (5.63) [0.45/0.07 (6.43)], patella 0.16/0.08 (2.0) [0.17/0.08 (2.12)], chela 0.67/0.11 (6.09) [0.65–0.67/0.12–0.13 (5.42–5.16)], hand 0.32

[0.31], movable finger 0.38 [0.37–0.38]; ratio movable finger/hand 1.20 [1.20–1.23], femur/movable finger 1.19 [1.22–1.3], femur/carapace 1.25 [1.32], chela/carapace 1.86 [1.91–1.97], chela/femur 1.48 [1.44–1.48].

REMARKS. The new species is ascribed to the genus *Ephippiochthonius* based on the following features: setae hp_3 in proximal portion of chelal hand absent, tip of fixed chelal finger of ♂ with a deep hollow on paraxial face and subapical protuberance (*sp*). The new species belongs to the *fuscimanus*-group defined by Gardini [2013] and Zaragoza [2017] as having fixed chelal finger with triangular subequal teeth, followed by few rounded teeth, as far as the proximal third of the finger, proximal third of movable chelal finger with weakly undulated marginal lamina, intermediate paraxial setae hi_1 of chelal hand level with trichobothria *ib*/*isb*, hi_3 and hi_4 more distal. Zaragoza [2017] highlighted that *fuscimanus*-group did not possess the chelal lyrifissure ma_2. The new species distinctively possesses ma_2. Lyrifissures ma_2 are absent in both *gibbus*-group and *fuscimanus*-group. The *gibbus*-group are also characterized by intermediate paraxial setae hi_1, hi_3 and hi_4 of chelal hand level with trichobothria *ib*/*isb* and absence a marginal lamina in movable chelal finger. Lyrifissures ma_2 are present and in *tetrachelatus*-group, but this group is characterized by the absence of marginal lamina in movable chelal finger and the location of the intermediate paraxial setae hi_1, hi_3 and hi_4 of chelal hand as a *gibbus*-group.

At the same time, Gardini [2013] attributed the *E. gestroi* (Simon, 1896) to the *fuscimanus*-group since it is characterized by thick marginal lamina of proximal half of movable chelal finger, sometimes weakly irregularly undulated. Proximal half of movable chelal finger at *E. sarmaticus* sp.n. with weak marginal lamina with low and rounded vestigial teeth, which makes this character less noticeable while still operable. The presence of this plate and location of chelal setae hi_1, hi_3 and hi_4 provides a reason to assign this species to the *fuscimanus*-group. Zaragoza [2017] indicated the stability of the distribution lyrifissure patterns in chela and its greater importance in taxonomy within the genus. By ascribing *E. sarmaticus* sp.n. to the *fuscimanus*-group basing on the complex of characters, we reveal one more exception for this character for this species group (together with *E. gestroi*), the absence of ma_2.

Gardini [2009, 2013] and Zaragoza [2017] showed high diversity of *fuscimanus*-group in different regions while the species are highly locally endemic. We assume that *E. fuscimanus* reported for the Caucasus region could be a species group consisting of local endemics. Within the *fuscimanus*-group, the new species is the closest to *E. nanus* (Beier, 1953) [Beier, 1953]. It is readily distinguished from *E. nanus* by: the distance between the anterior and posterior eyes is less than the diameter of the anterior eyes; lyrifissure ldb on chelicera present; chelal lyrifissure ma_2 present, chelal teeth progressively decreasing in size, fixed chelal finger at the level of est-it with 4 teeth occupying 0.1 mm (distance between successive apices 0.03 mm).

Ephippiochthonius oryzis sp.n.
Figs 3–4, Map.

HOLOTYPE 1 ♂ (ZMMU TI-52), Russia, Krasnodar Region, close to Kalininskaya settlement (45°29”22"N, 38°34”52"E), rice paddy bunds, 3.06.2016, leg. K.B. Gongalsky.

PARATYPE 1 ♂, 1 ♀ (ZMMU TI-53), same collecting data as holotype.

DISTRIBUTION. Known from the type locality so far.

NAME. The name comes from the rice, *Oryza sativa* L. (Poaceae), among plantations of which, mainly at rice paddy bunds the new species is discovered.

DIAGNOSIS (♂ ♀). An eyed epigean *Ephippiochthonius* that differs from other species of the *tetrachelatus*-group with the following combination of characters: movable cheliceral finger with a small isolated subapical tooth (*di*) in the form of a blunt tubercle level with spinneret; spinneret (*cs*) present; carapace with the short epistome; lateral ocular setae 1.5–2 times longer than sublateral ocular setae and approximately equal in length to anterolateral setae; posterolateral seta (*pl*) of carapace present; pedipalpal hand (in lateral projection) with weak depression at the level of *ib*/*isb* and an abrupt slope between trichobothria *ib*/*isb* and *eb*; fixed and movable chelal fingers respectively with 14–16 and 7–8 triangular teeth; fixed chelal finger at level of *est*-*it* with 4–5 teeth occupying 0.1 mm (distance between successive apices 0.02–0.025 mm); proximal half of movable chelal finger with 3–4 proximal vestigial teeth, gradually reduced back to level of *sb*; length of chela 0.64–0.67 (♂), 0.69 (♀), length of movable chelal finger 0.39–0.40 (♂), 0.41 (♀); chela 5.15–5.33 (♂) 4.6 (♀) times as long as deep; ratio of pedipalpal femur/carapace 1.22–1.27 (♂) 1.25 (♀).

Description of adults (♂ ♀). Integument pigmented, carapace, tergites, chelicerae and pedipalps brown; hispid granulation on carapace, on cheliceral palm, on ventrodistal surface of chelal hand and on the base of movable chelal finger.

Carapace subquadrate; anterior margin (Figs 3A–C, 4A, 4B) strongly dentate between median macrosetae, with short epistome; ocular area as in Figs 3A and 4A, anterior eyes with convex lens (diameter 0.037–0.04 mm), posterior eyes reduced to a smooth cuticular area (diameter 0.025–0.027 mm), poorly distinguishable, with a rough edge, all eyes with tapetum; distance from anterior eyes to anterior margin of carapace 0.03–0.035 mm; the distance between the anterior and posterior eyes 0.043–0.048. Chaetotaxy: 10 (20) macrosetae and 2 preocular microsetae on each side, posterior area with 2 medial macrosetae *pm* and 2 posterolateral seta (*pl*), all macrosetae thin; setal formula (preocular microsetae excluded): 4:6:4:2:4, anteromedial setae 0.09–0.11 mm long, anterolateral setae 0.08–0.083 mm long, sublateral ocular setae 0.047–0.062 mm long, lateral ocular setae 0.088–0.098 mm long; 4–5 lyrifissures anteriorly and 2 posteriorly.

Chaetotaxy of tergites: 4:4:4–5:4–5:6:6:6:6:1T2T1:4:1T2T1:0, tergites IX and XI each with 2 sublateral tactile setae.

Chaetotaxy of sternites: ♀ 10:(3)9(3):(2)8(2):(1)7(1):(1)4(1):(1)4(1):6:6:2T1T2:0:2, ♂ 9:(3)10(3):(2)7(2):(1)7(1):(1)4(1):(1)4(1):6:6:2T1T2:0:2, sternite X with 2 submedial tactile setae, in addition, genital notch of ♂ (Fig. 3F) flanked by 7 setae on each side and 4+4 internal glandular setae.

Genitalia. ♂ genitalia as in Fig. 3F, ♀ genitalia as in Fig. 4E.

Chelicera (Figs 3D, 3E, 4C, 4D) with 6 setae and 2–4 lateral microsetae on hand; seta *vb* 0.027–0.035 mm long, seta *it* 0.048–0.055 mm long, seta *db* 0.062 mm long, seta *dst* 0.10–0.12 mm long, microsetae 0.012–0.015 mm long; all macrosetae are about the same thickness; hand with 5 dorsal and 1 ventral lyrifissure, lyrifissure *ldb* present. Fixed finger with 5–6 teeth proximally reduced in size (the first distal tooth is larger than the rest) and 6–8 proximal microtubercles; movable finger (Fig. 4D) with a small isolated subapical tooth (*di*) in the form of a blunt tubercle at level

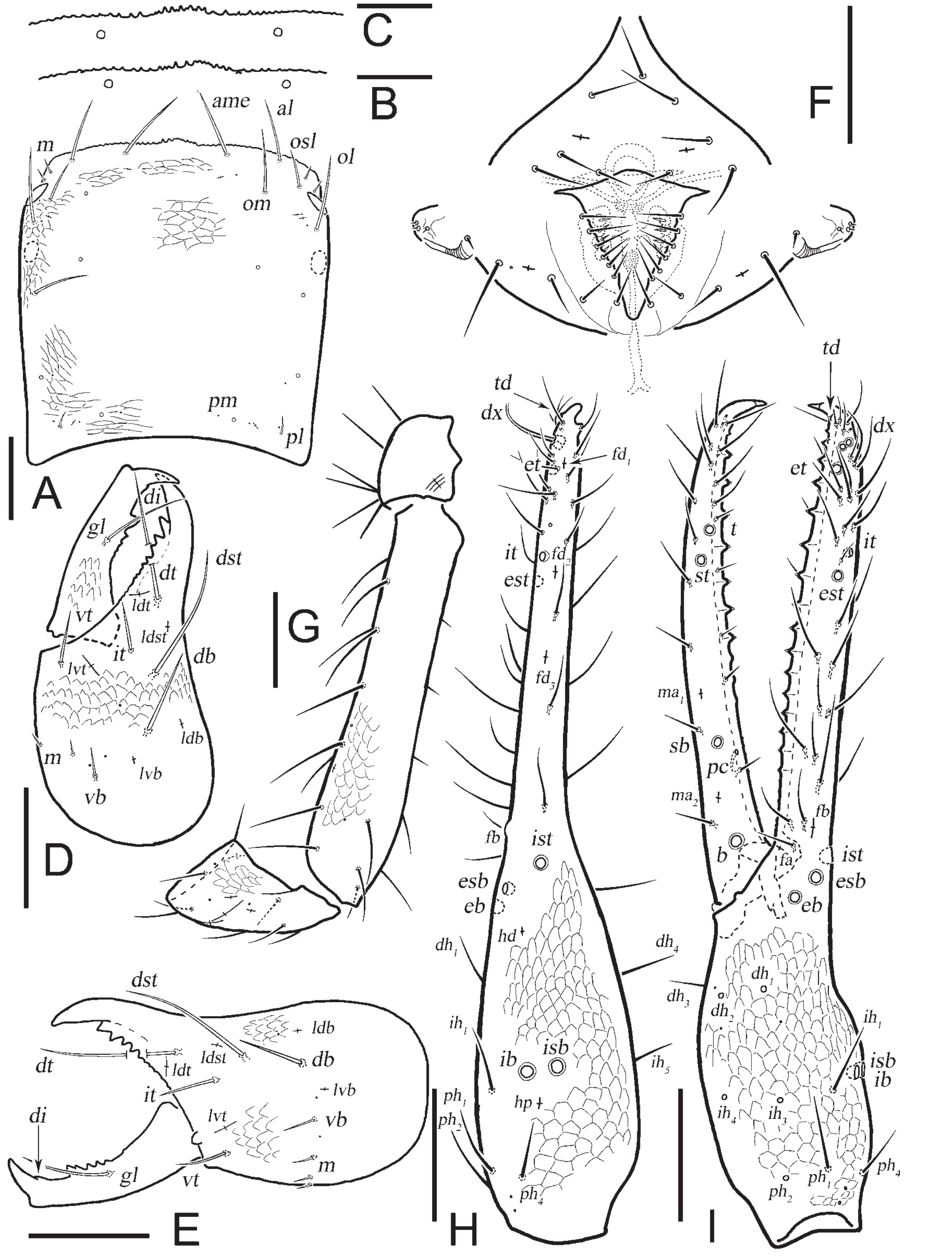


Fig. 3. *Ephippiochthonius oryzis* sp.n., ♂: A — holotype, carapace, dorsal view; B — holotype, anterior margin of carapace; C — paratype, anterior margin of carapace; D — holotype, left chelicera; E — paratype, left chelicera; F — holotype, genital area, genitalia are indicated by a dashed line; G — holotype, left pedipalp; H — holotype, left chela, dorsal view; I — holotype, left chela, lateral view. Scale bars: 0.1 mm (A, D–I); 0.05 mm (B, C).

Рис. 3. *Ephippiochthonius oryzis* sp.n., самец: A — голотип, панцирь, сверху; B — голотип, передний край панциря; C — паратип, передний край панциря; D — голотип, левая хелицера; E — паратип, левая хелицера; F — голотип, генитальная область, гениталии показаны пунктирной линией; G — голотип, левая педипальпа; H — голотип, левая хела, сверху; I — голотип, левая хела, сбоку. Масштаб: 0,1 мм (A, D–I); 0,05 мм (B, C).

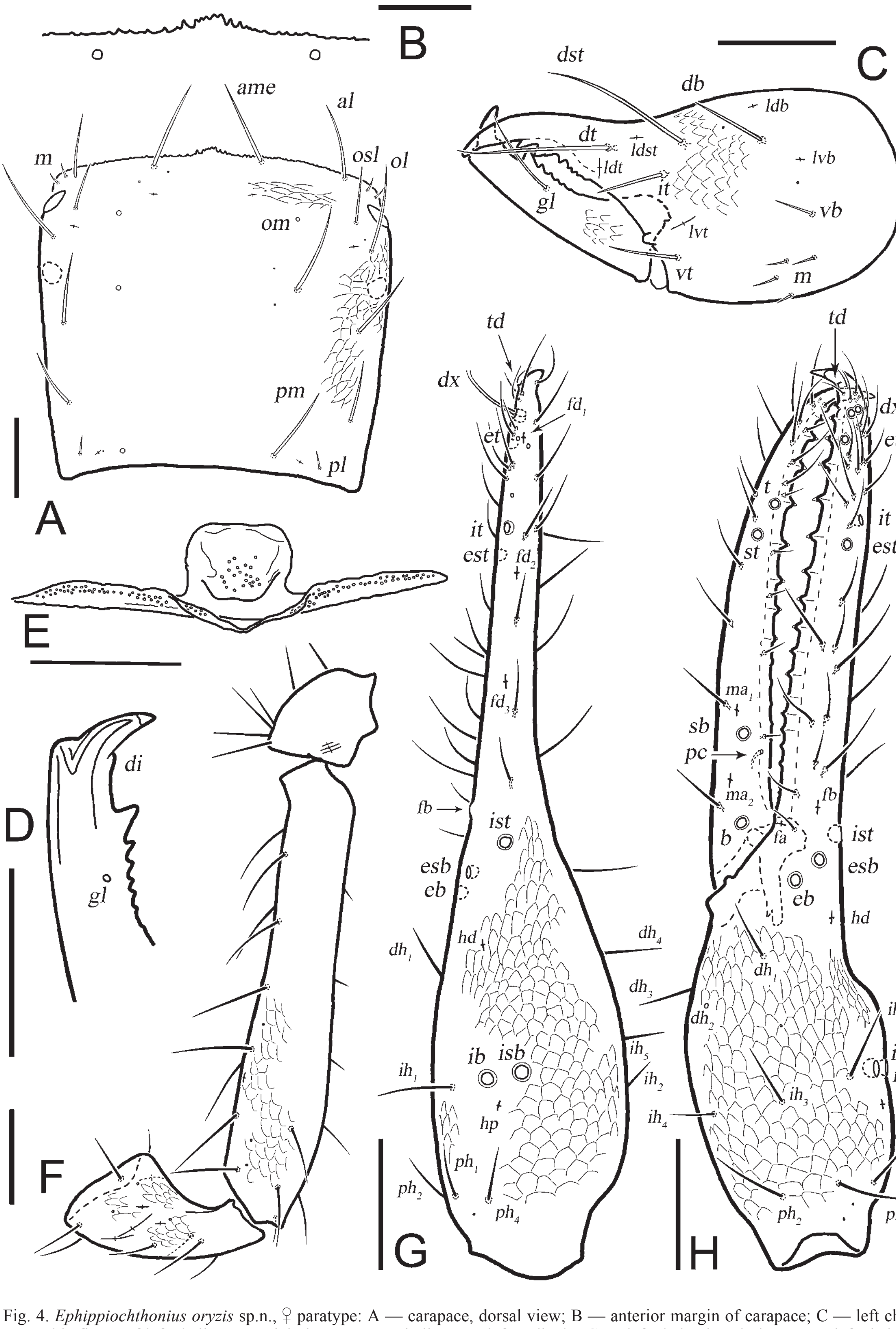


Fig. 4. *Ephippiochthonius oryzis* sp.n., ♀ paratype: A — carapace, dorsal view; B — anterior margin of carapace; C — left chelicera; D — movable finger of left chelicera, partial view; E — genitalia; F — left pedipalp; G — left chela, dorsal view; H — left chela, lateral view. Scale bars: 0.1 mm (A, D–H); 0.05 mm (B).

Рис. 4. *Ephippiochthonius oryzis* sp.n., самка, паратип: A –панцирь, сверху; B — передний край панциря; C — левая хелицера; D — подвижный палец левой хелицеры, часть; E — гениталии; F — левая педипальпа; G — левая хела, сверху; H — левая хела, сбоку. Масштаб: 0,1 мм (A, D–H); 0,05 мм (B).

with the spinneret (*cs*), 3–5 teeth (the first distal tooth is larger than the rest) and 2–3 proximal tubercles; *gl* ratio 0.55–0.60; spinneret prominent and apically rounded; rallum with 11 blades; serrulae interior and exterior respectively with 12 and 14–15 blades.

Coxal setae: Pedipalpal coxa with 5 setae (including 2 on manducatory process), distal marginal seta of disk 0.09–0.10 mm long; coxa I 3 + 3 marginal microsetae, distal marginal seta 0.05–0.06 mm long; II 4 + 5–7 bipinnate coxal spines, III 5 + 3–4 bipinnate coxal spines and IV 6; intercoxal tubercle bisetose.

Pedipalp: femoral chaetotaxy 3:6:2:5:1 (Figs 3G, 4F). Chela (Figs 3H, 3I, 4G, 4H) with hand weakly depressed at level of *ib*/*isb* and an abrupt slope between trichobothria *ib*/*isb* and *eb* (more strong hump in ♀); chaetotaxy 4:5:3; seta ph_3 lacking, setae ih_1, ih_3 and ih_4 approximately level with trichobothria *ib*/*isb*. Fixed finger with 14–16 teeth, mostly pointed and proximal half progressively decreasing in size, dental row reaching slightly proximally of trichobothrium *sb*; base of fixed finger with 4–6 microtubercles; tip of fixed finger with a modified accessory tooth (*td*) on antiaxial face; tip of fixed chelal finger of ♂ with a deep hollow on paraxial face and a pronounced subdistal protuberance (*sp*); fixed chelal finger at level of *est*-*it* with 4–5 teeth occupying 0.1 mm (distance between successive apices 0.02–0.025 mm). Distal half of movable chelal finger with 7–8 upright, triangular teeth with dental canals, with one subdistal very small tooth, all with dental canals, level halfway between trichobothria *st* and *sb*; proximal half of movable chelal finger with 3–4 proximal vestigial teeth, gradually reduced back to level of *sb*; base of the fixed finger with a variable number of microtubercles; coupled sensilla *pc* halfway between *b* and *sb*, mostly nearer to *sb*; trichobothria as in Figs. 3J and 4I, *eb*-*esb*-*ist* mostly arranged in a straight line; distance between *st* and *sb* 1.9–2.1 times longer than that between *sb* and *b*. Chelal lyrifissure patterns *hp*, *hd*, *fb*, *fa*, fd_1, fd_2, fd_3, ma_1, ma_2 present.

Measurements and ratios. ♂ holotype, followed by ♂ paratype in square brackets: Body 1.26 [1.25]. Carapace 0.37/0.35 (1.06) [0.37/0.36 (1.02)]. Chelicera 0.31/0.16 (1.93) [0.33/0.17 (1.94–2.0)], movable finger 0.17 [0.17]. Pedipalp: femur 0.45/0.08 (5.63) [0.47/0.08 (5.87–6.43)], patella 0.18/0.10 (1.8) [0.18/0.10 (1.8)], chela 0.64/0.12 (5.33) [0.67/0.13 (5.15)], hand 0.30 [0.32], movable finger 0.39 [0.40]; ratio movable finger/hand 1.30 [1.25], femur/movable finger 1.15 [1.18], femur/carapace 1.22 [1.27], chela/carapace 1.73 [1.81], chela/femur 1.42 [1.43]. ♀: Body 1.27. Carapace 0.40/0.38 (1.05). Chelicera 0.36/0.17 (2.12), movable finger 0.19. Pedipalp: femur 0.50/0.09 (5.55), patella 0.20/0.10 (2.0), chela 0.69/0.15 (4.6), hand 0.34, movable finger 0.41; ratio movable finger/hand 1.21, femur/movable finger 1.22, femur/carapace 1.25, chela/carapace 1.73, chela/femur 1.38.

REMARKS. The new species is ascribed to the genus *Ephippiochthonius* on the basis of the following features: setae hp_3 in the proximal portion of chelal hand absent, tip of fixed chelal finger of ♂ with a deep hollow on paraxial face and subapical protuberance (*sp*). The new species belongs to *tetrachelatus*-group as defined by Gardini [2013] and Zaragoza [2017] by having the chelal teeth of the fixed finger present nearly to the base of the finger, the movable chelal finger with low, rounded, sometimes vestigial teeth, without a marginal lamina, intermediate paraxial setae hi_1, hi_3 and hi_4 of chelal hand level with trichobothria *ib*/*isb*, chelal lyrifissure ma_2 present. Schawaller & Dashdamirov [1988] found broad morphological variation in populations that were attributed to *E. tetrachelatus*, but were unable to find consistent morphological differences that could be used to identify distinct species. This species, as *E. oryzis* sp.n., could be the member of *tetrachelatus*-group endemic to the studied area. Within the *tetrachelatus* group, the new species is the closest to *E. nidicola* (Mahnert, 1979) from Switzerland and Germany [Mahnert, 1979; Muster, 2004]. It is distinguished from *E. nidicola* by the presence of isolated subapical tooth (*di*) in movable finger (form of a blunt tubercle), number of teeth on fingers of chelicera and setae length of the carapace — setae *ol* 1.5–2 times longer *osl* and approximately equal in length al, *ol* reaches by its apical part the edge of carapax. The new species prefers drained soils of the rice paddy surroundings, while *E. nidicola* ihhabits holes of small mammals and forest litter. The subapical tooth (di) in movable finger is not long, in the form of a blunt tubercle, which makes it clearly visible mainly in the lateral projection. At the same time, it is found in all caught individuals of both genders, which indicates the stability of this trait. This form of subapical tooth is not characteristic of any other species of the genus *Ephippiochthonius*.

Discussion

The two species are first records of the genus *Ephippiochthonius* for the Ciscaucasia, except for *E. tetrachelatus* and *E. fuscimanus* known for the Caucasus region, species identity of both of which is not yet confirmed. Based on high taxonomic richness and local endemism of the European species belonging to both *tetrachelatus*-group and *fuscimanus*-group, one can expect new endemic species of this genus from the Caucasus region and in other areas of the Eastern Mediterranean, including the territory of Ciscaucasia. Based on a complex of newly proposed morphological characters by Gardini [2013] and Zaragoza [2017], one can further separate closely related species. The complex of lyrifissure patterns in chela and chelicera requires special attention.

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